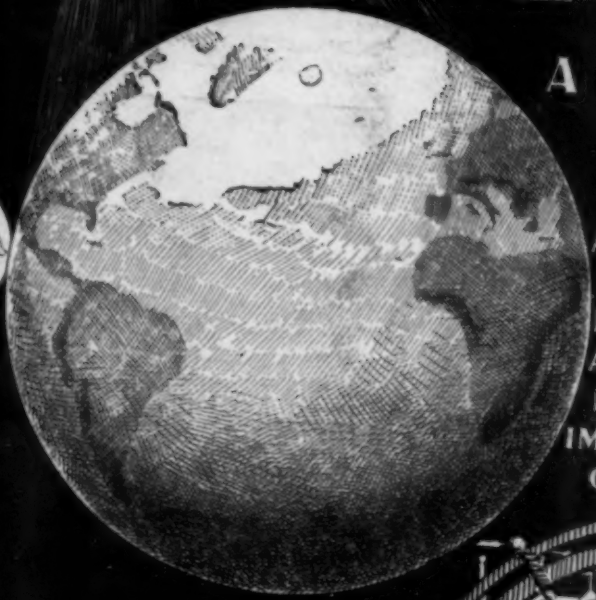
Vol. XII. No. 3. March, 1903.

# THE AMERICAN X-RAY JOURNAL



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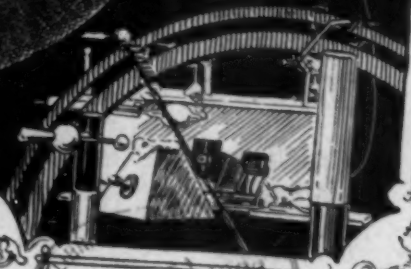

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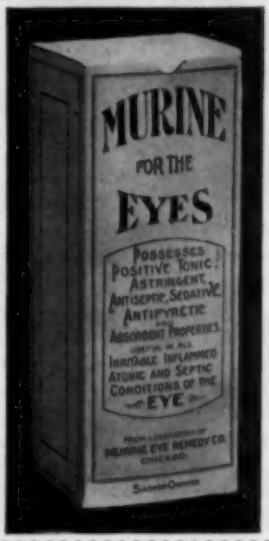


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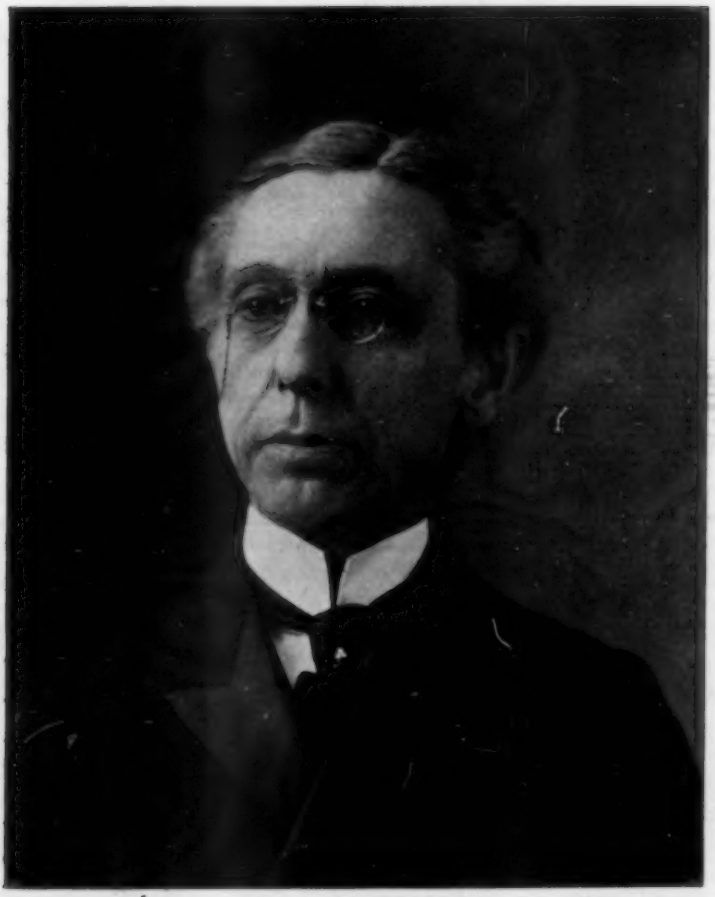


PROFESSOR A. D. ROCKWELL, A. M., M. D.

THE AMERICAN
X-RAY JOURNAL.
Devoted to Practical X-Ray Work and Allied Arts and Sciences.

VOL. XII. CHICAGO, MARCH, 1903. No. 3.

## Technique of X-Ray Therapy.*

BY H. PRESTON PRATT, M. D.

Nothing succeeds like success, and success cannot be obtained in this work unless the physician is well versed in the technique of its therapy, which implies a thoro knowledge of anatomy, physiology, pathology and physics. The greater portion of the technique centers in the working of the tubes independently of the apparatus which energizes them.

We are dependent entirely upon the number of lines of force projected from the tube to bring about ionization of the tissues. Ionization means changes in the elementary structures, an increase in metabolism; or, in other words, a hastened normal physiological change brot about thru electrolyzing the tissues.

We need to have the greatest possible number of these lines of force within a given space for our best therapeutic work. This is only possible with a low or soft tube. Each electrical movement in a line of polarized atoms dissociates a definite number of elements composing the tissue, and this dissociation and the reassociation of the freed ions decomposes and destroys the cancer cell, or the bacilli of various diseases. The various bacilli and the protozoon of cancer are practically identical in composition with the tissues of the human body. Now the x-ray will not destroy germ life by its direct action, any more than the sun's rays. The bacterioidal effect of both are due to ionization or electrolysis. We here assume that the sun's rays and the x-rays are purely electrical phenomena.

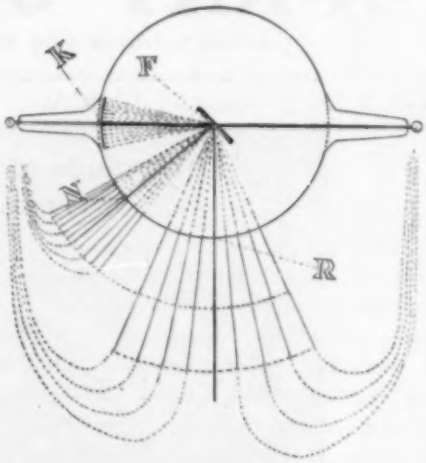
When we accept this theory of ionization, we must admit that all the elements (which number about 80) are independent centers of force, exhibiting polarity, that chemical affinity is only another name for the electrical forces of the ions, and that all changes in matter are due to the differences of electrical pull among the ions. If it be granted that the x-ray is an electrical phenomenon there must be an x-ray circuit, corresponding to any ordinary electric current. In electrolysis of the tissues the ions, according to my conception, are a part of the x-ray circuit, and are attracted or repelled according to the direction of the lines of force. Each element or ion moves in one direction or the other according to its polarity, if electro-negative it passes in the direction of the lines of force, if electro-positive, in the opposite direction. Now there are extending from the x-ray tube chains of polarized atoms, of varied lengths, the length of the chain depending entirely upon the force of impact of the particles of gas thrown out from the kathode stream, which strike the inner surface of the glass or other material. This impact is the source of the ex-ray. The force of impact varies in different portions of the tube, each particle of gas that strikes the inner surface of the tube gives a certain impulse to its chain of

*Read before the American Roentgen Ray Society at its third annual meeting in Chicago, Dec. 11, 1902.

polarized atoms, which is transmitted outward at right angles to the surface of the ordinary tube until its potential falls, when it meets its return element, which has proceeded at the same time from the tube, and by which the x-ray circuit is completed back to the tube. Each chain of atoms has its own potential. These varied potentials of the tube are considered by some physicists as different kinds of x-rays, when as a matter of fact they are all one and the same, without any other difference except that of potential.

The kathode stream is built up of streaming particles of matter, which serve to establish the electrical connection between the kathode and the anode. With an increased electrical current in the circuit which energizes the tube, more particles of gas are added to the kathode stream, hence a greater number of active particles are thrown out from the kathode stream, which bombard the inner surface of the glass, giving rise to an increased number of energized lines of atoms in the shape of x-rays.

A line in the middle of the kathode stream, from K, the center of the kathode, to the focal point F, of the antikathode, is in the axis of the tube. The greatest concentration of the particles of gas reflected from the kathode stream is in a line normal to or at right angles to the surface of the antikathode. The tube at this point, owing to the increased number of particles striking its inner surface, becomes heated much more readily than any other portion of the tube. This point is designated by the letter N. At any other point, say at R, in which the reflected ray is perpendicular to the axis of the tube, these particles of gas are less crowded, but have individually greater speed on account of having a freer path. We find that the greatest possible penetrating power obtainable from any tube is in this perpendicular line R, which is at right angles to the axis of the tube, starting from the focal point F. The point N, at which is the greatest




number of particles of gas, is the point from which the greatest number of atomic chains start out, but the penetrating power of the ray is there cut down. At the point N, the tube could be considered "softer" than at any other point. In the perpendicular line passing from the focal point F to R, each particle has a much freer path than from F to N, consequently the greatest penetrating power is at the point R. This would be commonly understood by the statement that the tube is harder at R than at the point N.

Physiologically the point at which the x-ray enters the body can be considered as the anode; and the point of exit, providing the ray passes thru the body, the kathode. But if the ray penetrates only a short distance, the point of zero potential can be considered the kathode. Certain chemical changes take place, namely, the accumulation of acids at the anode, and of alkalis at the kathode. The changes that take place between these two points are simply electrolytic.

The factors to be considered in raying are (1) the potential of the ray, (2) the resistance of the tissues to the ray,

and (3) the resulting intensity of radiation. Of these three factors the first only is under control, and it depends entirely upon the conditions in the tube, which is constantly varying, but which by corresponding changes in the current energizing the tube, the spark gap, etc., may be made approximately constant.

Nutritious remedies, containing elements required for the tissues treated, which readily enter into metabolic changes, are necessary in all serious cases. Otherwise the resistance of the normal elements will be reduced by starvation.

WORDS OF CAUTION.

In x-ray therapy always use a low or soft tube and crowd the current to suit the case. But if this is impossible for lack of the necessary apparatus, use a tube just high enough to cause the rays to penetrate the tissues to be treated. Never use a high tube near the body because the discharges from the terminals, which are alternating in character, produce muscular contractions which tend to pump the infection along the lymphatics. In using the static breeze to heal the skin-lesion of cancer, keep it far enough away from the body to avoid any danger of spark or other irritating discharge, for on account of the above reaction, while it certainly helps the local condition, it is liable to cause muscular contractions and make the general condition worse. Never expose a large surface to the ray at a time, because an increased amount of effete matter is thrown into the circulation, and may produce auto-toxemia. See that all of the organs of elimination are kept active. Change the position of the tube in relation to the patient, or the position of the patient with reference to the tube, every minute or two, so that a greater number of cells will come under the influence of the ray. Never expose a patient directly to the ray, but interpose a celluloid screen, of from 1/32 to 1/16 of an inch in thickness, between the patient and the tube. Before exposing a patient to the ray, be sure to render the parts to be exposed aseptic by the use of one to five per cent solution of carbolic acid or other antiseptic, and after treatment dress with antiseptic gauze. Never be afraid of an x-ray burn, watch carefully, that is all. Malignant conditions do better with an x-ray burn than without.

It is just as necessary for a physician to protect himself as his patients against too much raying, or he will himself suffer from irritation or auto-intoxication from time to time.

The x-ray is not a cure-all, and there are conditions in which the knife will be necessary to remove the septic matter.

In some cases of tubercular affections of glands considerable advantage has been derived from the use of a celluloid cream containing creosote, with the addition of laudanum at times; the invention of Dr. Alexander C. Wiener, of Chicago. The cream is placed on cotton on the skin over the gland, or over the affected pulmonary region, and the absorption of the medicaments is much facilitated by the x-rays.

# Electricity in Medicine.

BY A. D. ROCKWELL, A. M., M. D.,

NEW YORK.

What is the place that electro-therapy should hold in the nomenclature or ethics of the healing art? For electro-therapeutics cannot be considered a specialty in the sense that neurology, or ophthalmology, or laryngology are specialties. Like hydro-therapeutics, it is simply the application of a single remedy, tho one having an enormously wide range, to diseased conditions. Thus electricity belongs to every general practitioner, but more distinctly, perhaps, to the neurologist. It often aids him in diagnosis and prognosis as no other instrument can, while as a palliative in some organic conditions, and as a curative in some of the functional neuroses, it is indispensable. It also belongs to the surgeon; for the cautery, electrolysis, and x-rays give him valuable adjuncts to his knife, and in some cases supersede it. Gynæcology, obstetrics, ophthalmology, laryngology, can all find more than occasional uses for its powers; while its well attested influence over nutrition must give it a place in general medicine.

Unfortunately a far more intimate acquaintance with the physics and physiology of electricity, and with the laws which govern its action on living tissues, is demanded, than the average practitioner can claim to possess. He must recognize that electricity is a generic term, not a simple, single manifestation of force, but susceptible of so many modifications of its units of measurement, that its various currents so-called, may be said almost to differ in kind as well as in degree. How many physicians who utilize electricity, have studied or even clearly understood Ohm's law? Yet this law is the foundation upon which is built the whole superstructure, and *without a knowledge of it no one can be a master in electro-therapeutics.*

This great law is expressed in the formula, $C = E/R$. In other words, current (C) equals the electro motive force (E), divided by the resistance (R). E, or electro-motive force, is the force that urges on the current. R (resistance) is that quality of a conductor that impedes the passage of electricity. C is the current strength, resulting from the two former. With no resistance, the current would equal the electro-motive force; but as every circuit must offer some resistance, the current can never equal the electro-motive force. The unit of electro-motive force is the *volt*. The unit of resistance is the *ohm*. The unit of current strength is the *ampére*. An electro motive-force of *one volt*, passed through a resistance of *one ohm*, yields *one ampére* of current.

The importance of Ohm's law can now be seen. The strength of the current varies directly as the electro-motive force, and inversely as the resistance. Therefore, by this law, one volt passed thru a resistance of 1,000 ohms, yields but 1-1,000th of an ampére, or one milliampére. The human body, generally speaking, offers some thousands of ohms of resistance; hence in therapeutics, the *milliampére* becomes the practical unit of measurement, rather than the ampére. The ordinary mind is often confused thru ignorance of the relationship of these units of measurement. The adoption of electricity in the state of New York as the method of execution, has made it generally known that "1.700 volts" are sufficient to kill; yet many thousands of volts are every day being applied to the human body for the relief and cure of disease. But it is simply a question of electro-motive force,

or potential, together with *amperage, or quantity*. A current of high potential, for therapeutic purposes must necessarily be of very low amperage; and when the amperage is high the potential must be low.

The "strength" of a current about which we say so much, is measured in ampéres, or fraction of an ampére. The quantity of electricity conveyed by a current of one ampére in one second, is called one coulomb, but in therapeutics it is more necessary to know the current strength, or amperage, than the absolute quantity as indicated by coulombs. Yet it should not be forgotten that it is quantity that decomposes chemical substances, and the operation of electrolysis largely depends upon the quantity of electricity that flows thru the tissues acted on.

Static electricity has but little quantity or current strength, but has an enormous electro-motive force or pressure; and thru the electro-tonic, and perhaps some chemic changes produced, and its influence over metabolism, it is capable of important therapeutic effects. It aids also in the relief and cure of disease by changing the electric condition of the patient, in giving a positive or negative charge, for a greater or less length of time. Still more remarkable are the effects of high-frequency currents of high tension, which often have subtle and far reaching effects. On the contrary, currents of magnitude, or large amperage, as the galvanic, or the faradic in less degree, do not charge the body with electricity, or leave in it any more electricity than they find there.

In thus emphasizing the importance of a clear understanding of Ohm's law, it is not to be understood that no one should use electricity who has not fully mastered its physics and physiology, or whose practical experience is but limited, or whose variety of apparatus is meagre. Let such an one work cautiously with what skill and appliances he has. His motto should be, "Much too little, rather than a little too much," for electricity in medicine is an important factor for good or evil; and he should always work aided by *measurements and records* of what currents or potential he is using. The greatest evil is the utterly unscientific spirit of many. The writer has received a letter from a physician asking, "What kind of electricity he should use in a case of neuralgia, and how to use it?" The idea of this correspondent, that but little preliminary study or experience is required to successfully utilize in therapeutics so powerful a force, and one having such a wide range as electricity, is but too common. Another correspondent wished to know my experience in the treatment of locomotor ataxia? "He had cured several cases, and had dissipated several fibroid tumors by internal applications of the faradic current!" Still another physician affirms that he has "broken his heart over electricity," that "he has found it almost worthless as a therapeutic agent."

It is thus not enough that one should be equipped with every modern appliance for electro-therapeutic work. Most sanatoria and many public hospitals are well equipped; but how much intelligent and effective electro-therapeutic work is done in these institutions? It is so far commendable to supply oneself with a complete working equipment, even while largely in ignorance of its proper use, provided one uses it as a basis of growth, and measures and records *how* it is used in every case; but worse than useless if there is no growth founded on real study. Aside from any actual injury that haphazard and ignorant application may inflict, it does harm by conveying the impression that what the incompetent does, is all there is to be done in electro-therapeutics. In one establishment within the writer's knowledge, there was recently installed an enormous static machine at a cost of several thousand dollars. The

owner was (and still is) quite ignorant of first principles, but he now *poses* as a master in the art. It is so easy to learn to set in motion an apparatus, big or little, static, faradic, galvanic, sinusoidal, or high frequency; and it is so difficult for the *victim* to know whether he is receiving expert or non-expert treatment! The case of the correspondent who had cured both locomotor ataxia and fibroids with the faradic current, was simply that of an illogical mind having no adequate acquaintance either with the pathology of the disease, or the energy utilized.

One of the most difficult problems in electro-therapeutics is to correctly differentiate between the various manifestations of electricity, and select the form most suitable to the case in hand, adjusting its measurements accordingly. If we wish mechanical effects, we select alternated currents of slow or rapid make or break; for chemical effects only currents giving a considerable amperage are applicable; while physiological effects of some kind, like physical effects, are excited by every possible manifestation of electricity. Mechanical, physical, and chemical effects, although more or less modified by vitality, are not peculiar to living bodies. Physiological effects, on the contrary, take place by virtue of the vital properties of the body. Currents of enormous potential have undoubtedly widened the sphere of usefulness of electricity in developing physiological phenomena, yet it may be doubted whether they excite any really new physiological effects.

The fundamental idea of the therapeutics of electricity, is its *nutritional* influence, an idea enunciated and developed years before the discovery and utilization of high-frequency currents. There is no form of electricity but has a certain influence in this direction; yet for the purpose of increasing general nutritional activity, exciting metabolic changes, and developing the potential energy of cell life, it is the general *consensus* of opinion, that in currents of high frequency and potential we have an energizing motor principal, superior to other electric modalities. Still, while welcoming the new, let us not forget the old, remembering that the magnitude of these high potential currents is practically *nil*, and that magnitude or amperage is in a multitude of conditions absolutely essential.

As has been well said, "If we wish to do our work scientifically, our motto should be measurement, measurement, measurement." So if we would get the best and quickest therapeutic results, our motto should be "differentiation." Not only must we strive to adjust electric modalities to pathological conditions, but the personal equation in each case should receive due consideration. Some patients react better to one electric modality, while others suffering from the same apparent pathological condition, for no apparent reason react better to another. No matter for what form of electricity one may have a preference, the worker who is supplied as he should be with every necessary variety of apparatus, will frequently have occasion to call in the aid of each

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*Recent Advances in Electrotherapeutics.*—According to Morton the elevation of the electromotive force and its oscillations or alterations make possible the electrification of the whole body at once, increasing oxidation and tissue metamorphosis. This is especially useful in diseases of perverted nutrition like rheumatism, obesity, etc. He briefly discusses the applications of the static induced current, the wave current, the Tesla and the D'Arsonval transformers, and the Oudin resonator, the brush discharge, the Geissler tube, and the Bequerel and Roentgen rays. The apathy of the profession toward this branch of therapeutics is incredible.—H. M.—*Med. News, December* 27, 1902.

# The Therapeutic Application of the X-Rays.*

BY MARCUS F. WHEATLAND, M. D.

Member of the American Electrotherapeutic Association; American Medical Society; American Association for the Advancement of Science; American Anthropological Society, etc.

At the present time we are unable to say just what x-rays are. Scientists are divided in their opinions, and various theories are advanced to account for the phenomena which take place when a Crookes tube is actuated by an electric current. It is generally considered to be a form of transverse ethereal vibration, in a series with the Bequerel rays and rays of ordinary light, the x-rays being irregular impulses, the Bequerel rays less irregular, and the light rays orderly impulses of the ether. We can go no further than to say that the x-rays are the result of the bombardment of the kathode stream upon the anode target, and from the bombardment emanates phenomena known as x-rays. These rays move in straight lines, and, unlike ordinary light, can neither be refracted, reflected, nor polarized. They penetrate in different degrees substances which are opaque to ordinary light, the degree of penetration depending upon the density of the substance acted upon. The greater the density, the lesser the penetration, and vice versa. The structures of the body offering the greatest resistance are the bones, on account of the large amount of inorganic material which they contain. The soft tissues are more penetrable, containing as they do a lesser amount of salts and a greater quantity of water and organic matter.

When the rays are applied to the healthy tissues of the body one of the first changes noted is the increased amount of pigment deposited in the area exposed. This deposit seemingly depends upon the complexion of the individual, the darker the color, the greater the change. Long continued applications of moderate doses (not sufficient to set up a violent reaction) produce a drying of the skin, and its modifications as seen on the hands of many operators. This is due to a thickening of the walls of the small blood vessels of the part, which tends to narrow their caliber and diminish the nutrition.

When the exposures have been sufficiently strong and frequent to set up a frank reaction, the changes may be similar to those of the three degrees of burning, with the exception that the devitalizing action on the cells is greater and the process of repair is slower to a marked extent; indeed my records show that Mrs. L. discontinued treatments April 3, 1902, when the first sign of dermatitis presented itself, and tho destruction extended to the second degree only, yet she was not sufficiently recovered to renew treatment until September 10, 1902, nearly five months after the development of the first symptom. Of course the age and debility of this patient had much to do with the slowness of the process of repair.

The curative action of the rays which was first called into use in the treatment of lupus and epithelioma has been extended to cover sarcomas and carcinomas, both superficial and deep, tubercular osteomyelitis and adenitis, chronic inflammatory processes of the skin and internal organs, callus sinuses resulting from operations, vascular and pigmented nevi, and filroid tumors of the uterus.

In malignant growths all agree with Morton when he summarizes the advantages of the rays as follows:

1. Relief from excruciating pain.

*Read before the Newport Medical Society, November, 1902.

2. Reduction of the size of the new growth.

3. Establishment of the process of repair.

4. Removal of odor if present.

5. Cessation of discharge.

6. Softening and disintegration of lymphatic nodes.

7. Disappearance even of lymphatic enlargements not submitted to treatment, and often quite distant.

8. Removal of the cachectic color and appearance of the skin.

9. Improvement of the general health.

10. Cure up to date of a certain number of malignant growths.

At this point it is quite pertinent to ask how these changes are inaugurated? From the various theories advanced, the writer accepts the following:

The x-ray vibrations acting upon the cancer cells tend to stimulate many to maturity, at the same time breaking down the weaker ones, which are absorbed by the lymphatics and enter the circulation producing the intoxication so frequently observed; the number of cells reaching maturity and those undergoing destruction depending upon the intensity of the reaction established. At the same time changes take place in the small blood vessels, their coats become thickened and tends to narrow their caliber, thereby lessening the blood supply and aiding the return of the circulation to the normal.

In the treatment of large malignant growths it is still debatable as to whether it is not better to remove the mass if possible and ray afterwards, so great at times is the toxemia resulting from the absorption of the disintegrated elements of the neoplasm. Many object to an operation preceding the ray, because of the difficulty encountered in setting up a healthy reaction in recurrent growths. The best plan seems to be to ray cautiously, avoiding a sharp reaction (lest the resulting toxemia overcome the patient) and after the ray has done its work remove the remaining nodule by a simple operation. My personal experience with x-rays in therapeutics covers the following cases:

Mrs. L—, age 64, consulted me in April, 1902, with regard to a lump in her left breast which had been growing for about a year. It was tender to the touch and from it sharp pains darted thru the side. On examination I found the nipple retracted and firmly bound to the growth beneath, which was about 3½ inches in diameter and not adherent to the chest. Manipulation increased the pain which generally continued long after the examination. The glands in the axilla were slightly enlarged. Her general condition was good, excepting an intermittent pulse which did not seem to affect her in the least. The picture shows the condition when treatment began. The breast was protected by a shield of tin foil, exposing only the tumor, and she was given the first treatment April 15, 1902, from a low tube 1½ inch resistance, actuated by a 10-plate Static machine. Exposures were daily of 20 minutes duration at a distance of 2 inches from the part. After the first treatment pain gradually

subsided and completely disappeared after the third seance. Treatments were discontinued on the 20th at which time she complained of a smarting sensation around the nipple. In a few days the skin became very tender, small vesicles appeared, opened and coalesced, forming a raw, angry surface, extending over the area exposed. About this time the patient showed signs of constitutional disturbance. Her appetite disappeared, diarrhea developed, and her pulse markedly intermitted. She was in and out of bed during the greater part of the summer. The greatest difficulty was found in relieving the pain which came on as a result of the burn; it was extreme. This, no doubt, was due to the nature of the part involved and not the agent which produced it. The condition of the burn did not warrant a resumption of the treatment until August 22. At this time the tumor was smaller, pain had entirely gone, the infiltration around the nipple was so much reduced that it was easy to separate the parts and examine the base of it. The patient was entirely free from discomfort and, remembering her experience with the burn, had to be persuaded to return. This was considered necessary, on account of the few exposures she had had and fearing that there might be cells remaining unacted upon by the x-light which in time would manifest themselves. When treatment was resumed the protecting shield was abandoned and the breast and side rayed for ten minutes twice a week with the tube 10 inches from the part. She had the last treatment September 29, 1902, after which time another dermatitis appeared, fortunately there was no greater reaction than sufficient to produce a slight pealing of the skin. The patient, I consider, is cured. There is a small lump in the breast. The nipple, while it has not come out as far as it originally was, is quite loose. No doubt many of the cells forming the ducts leading up to it are destroyed and replaced by tissues, preventing a complete return of the parts to their normal outline. The patient has recently developed a bronchial asthma which, with her weak heart and advanced age, forbids my suggesting an operation for the removal of the remains of the growth.

*Case No. 2.* Mr. W—, age 40, was sent to me by Dr. Bull, Aug. 25, 1902, for x-ray treatment for enlarged glands of the neck. The patient had been operated upon by him last December for cancer of the tongue. The surrounding parts were protected with tin foil and the glands treated for ten minutes daily with a tube of 3-inch resistance, eight inches from the part and actuated by a 20-inch spark coil with electrolytic interrupter. In about ten days the patient thot his neck less stiff and felt better. Treatment was discontinued from August 31st to September 6th, with the idea of avoiding a burn if possible. At this time there was no sign of a dermatitis and the applications were resumed as before. In the course of a few days, noting no improvement, the treatments were prolonged to 12 minutes and the tube brot closer to the part. The condition of the skin looked threatening, but as the case was a desperate one, a burn was thot of but little importance if by pushing the treatment the desired reaction could be established. The mass continued to enlarge and his health began to fail. Treatments were discontinued September 24, 1902, at which time he sailed for England, whence he had come some sixteen months previous. He is at present in London and has resumed the x-ray treatment, with what results I am unable to say, as I have not yet heard from him.

*Case No. 3.* Dr. A. W— called on me in July with reference to his wife who had had her right breast removed about two years previous. For recurrences she

had undergone several subsequent operations. She had been trying the x-light in Philadelphia and desired the treatments continued while she remained in this vicinity. She made her first visit July 10th, at which time there was an ulcerated surface about 2½ inches long and 1½ inches wide, at the site of the original trouble. The cachexia was pronounced and her appetite poor. She was treated every other day (with a tube of about 2-inch resistance, excited by a 20-inch-spark coil, with electrolytic interrupter; exposure 10 minutes; until August 6th, when she developed a pleurisy. She gradually failed in health and returned to her home in Philadelphia. She did not improve under treatment. A mass was formed under the clavicle, which her husband said he would have removed when they reached home. I have been told that the patient has since died.

*Case No. 4.* Mr. W—, age about 58, came to me September 11, 1902, for x-ray treatments for eczema of the head and neck. He said he had been treated during the spring for the same disease located elsewhere. When I saw him his head and neck was covered with crusts, from the edges of which oozed yellowish pus. The face was swollen, the infiltration in the cellular tissues of the eyelids produced eversion of their margins, and made it impossible to close his eyes for sleep. Altogether he made a very pitiable spectacle. Fortunately the itching was not severe. Treatment was begun immediately with a very low tube, ⅛-inch resistance, excited by a 10-plate Static machine. On account of the various angles of the parts, the tube had to be changed from time to time, giving each area under treatment an exposure of 15 minutes. The case progressed very slowly. September 20, the skin began to clear up, and fearing a burn, treatments were not pushed so energetically. He, however, came daily, but was only treated upon those parts which seemed to be uninfluenced by previous efforts. In a few days, it was seen that the reaction was only temporary and the exposures were repeated as in the beginning. The case did not improve very rapidly and as the patient's time in Newport was growing short, I gave the last three treatments with a Queen tube, adjusted to a vacuum of 1 inch resistance and excited by a 20-inch spark coil with electrolytic interrupter. On account of the greater energy of this apparatus, an area was not treated more than eight minutes. When he left Newport, October 1, 1902, his face was much clearer; the infiltration of the skin had disappeared, so that the wninkles in his forehead returned and his eyelids became normal; indeed this improvement took place before the discharge ceased. From a letter received from his nurse, October 8th, I quote the following:

"I am very glad to write you that Mr. W— seems very much improved, and I am quite proud of him. There is still a redness of the skin on the face and neck, but there is very little, if any exudation; even the ears look very well. There are still some scales on the top of the head and the skin is very tender in the beard. His eyes are much better, also the forehead and cheeks are quite free from scales. If there is any decided change I will let you know."

I have since heard that he has completely recovered.

*Case No. 5* is that of Mrs. S., who was referred to me May 12, 1902, for x-ray treatment for sarcoma of the frontal bone, so diagnosticated by Drs. Bull and Coley of New York. When I saw the patient there was a decided enlargement of right half of the frontal bone. The temporal fossa was rounded out, the root of the nose widened and the right eye projected (exophthalmos), showing involvement of the orbital plate. The bone when pressed upon gave the sound similar to

the cracking of egg shells, the only subjective symptoms was a dull supraorbital neuralgia which readily responded to acetanilid before the x-ray was used. The surrounding parts were protected with lead foil and the area treated daily thru the forehead and temples alternately—with a tube 1½ inch resistance, 8 inches from the part, and excited by the static machine—until May 24, at which time she had an attack of muscular rheumatism which kept her away until the 29th, when she returned and was treated every other day until June 5, at which time dermatitis appeared on the forehead. The burn extended to the second degree, was not very painful and healed in about six weeks. During the latter part of the treatment the patient became forgetful: in the middle of a sentence she would become lost for words and in hunting for them would lose the idea she desired to express. From this state she gradually fell into a semi-comatose condition in which she remained until two days before death when the coma deepened. Death closed the scene August 23, 1902.

This case is interesting on account of the mode of termination connected with the report of a case by Dr. Gibson of Alabama at the last meeting of the American Electro-Therapeutic Association, in which cerebral symptoms developed during the use of high vacuum tubes on the temples which disappeared after the change to lower ones.

—In the case of Mrs. S., the kidneys being negative, both Dr. Stewart, the attending physician, and myself attributed the aphasia to pressure of the growth on the anterior lobes of the brain. I have, since the report of the case of Dr. Gibson, made further inquiries in this matter and have concluded that while the x-ray may have had some influence in the case the symptoms and mode of death above described, are those often associated with pressure on the anterior (silent) portions of the cerebrum, and it is most likely that that was the cause of death. It is well, however, to consider the possibility of danger in treating diseased tissues situated over important organs.

*Case No. 6.* Mrs. Hattie J., age 51, (colored). Have treated the patient many times during the past seven years for recurrent attacks of gastritis. About two years ago during an attack, there was discovered a thickening of the pyloric end of the stomach. With the bodily rest and suitable diet enjoined, she improved and went about her work without discomfort for many months.

Present interest in the case began June 29, 1902, when she had a severe recurrence with much pain and tenderness over the stomach and the usual vomiting. She was now treated with the x-ray every other day, and in the course of a few weeks so improved that she discontinued treatments. She returned, however, in August when along with her other symptoms she vomited dark brown material suggestive of cancer of the stomach. X-ray treatments were again taken up, raying the whole abdomen ten minutes with the tube ten inches from the part, excited by the coil—the chest protected with lead foil. Improvement was slow, she emaciated rapidly and I referred her to a surgeon with the idea of having an operation performed. After examining the case, he advised pylorectomy as offering the greatest hope to her. This she refused and decided to take her chances with the x-ray. treatments were continued every other day as before. In about three weeks she began to show signs of improvement, which gradually increased until the present time. She is now able to eat ordinary food without pain and discomfort. The growth which at the beginning was the size of an egg, is now hardly perceptible; there is no tenderness about the abdomen and the patient is taking on flesh. These cases show a great field for the x-ray in cancer.

# The Theory of Thunderstorms.

## The Picking Up of Negative Electricity from the Air by Raindrops.

The phenomena of terrestrial and atmospheric electricity, though they were probably the first to attract the attention of the primeval electrician, offer even in the present comparatively advanced state of our knowledge as many, if not more, unsolved problems as any other branch of electrical science. Take, for example, the permanent negative charge of the earth, which is known to be about 160,000 volts. What process in the economy of nature gives rise to, and maintains this charge? Elster and Geitel have suggested that it is due to the pouring-in of free negative ions from the atmosphere into the earth. Wilson has shown that negative ions in the air form more active nuclei for the formation of raindrops than the positive ions, and this circumstance may lead to an excess of negative electricity being carried to the earth by rain. Lenard, on the other hand, has shown that when raindrops or waterdrops of waterfalls are shattered by impact with the earth's surface they impart positive electricity to the earth and negative electricity to the air. This latter process would, if not counteracted, impart a positive charge to the earth instead of a negative. Lenard, however, also found that if the falling waterdrops contained in solution a certain percentage of salt, the process was reversed, and therefore we have in the dashing of the waves of the sea against its shores a process that contributes to the negative charging of the earth.

Herr Schmauss, in an interesting contribution to the *Annalen der Physik* (Vol. 9, p. 224), shows that there is still another natural process continually at work which tends to maintain the high negative charge of the earth.

Schmauss started with the intention of finding out whether the artificial ionisation of the air through which the water drops fell had any influence on the Lenard effect. The waterdrops were allowed to fall on the bottom of an insulated metallic vessel, connected to one terminal of an electrometer, the other terminal of which was connected to earth. The insulated vessel and the water-dropping nozzle were enclosed in a metal container, to screen off the effects of external electrical charges.

After the water dropping started, the electrometer indicated a gradual accumulation of positive electricity, due to the Lenard effect. But it was noticeable that the increase of the positive charge was slower at starting than after some time had elapsed. This was when the air through which drops fell was ordinary atmospheric air. When the air was ionised by exposure for some time to the Röntgen rays, the electrometer swung for a short time to the negative side, and then gradually returned to the positive side, towards which it continued to move.

Schmauss proceeded to determine whether this production of negative electricity, when the air was ionised, took the place of the Lenard effect, or whether it was merely super-added to it. To test this he weakened the Lenard effect by allowing the water drops to fall on sheets of wire gauze, instead of on a solid metal plate. If the new effect had simply replaced the Lenard effect, it ought to be reduced by the same means; if it were superadded, and the resultant effect was due to the difference, then when the Lenard effect was weakened, the production of negative electricity ought to be more marked in the movements of the electrometer needle. The latter was found to be the case.

The explanation arrived at by Schmauss was that the waterdrops, in falling through

the air, picked up an excess of negative ions, and thus became negatively charged. Zeleny (*Phil. Mag.*, 46, p. 120, 1898) has shown that an insulated plate, against which a current of ionised air is directed, becomes negatively charged, on account of the greater velocity of the negative ions. The conditions are the same when a waterdrop falls through ionised air, the only difference being that in the latter case the air is stationary, and the conductor moves. The conclusion therefore was highly probable that the waterdrops pick up free negative ions in falling through the air. Many other experiments were made by Schmauss to confirm this view.

At first, when the air was rich in negative ions, the waterdrops acquired enough negative electricity to counteract the positive charge due to the Lenard effect. But gradually the available negative ions get washed out of the air, and the positive Lenard effect again predominates. Hence the initial swing of the electrometer needle to the negative side, followed by the permanent movement to the positive side.

It was also found that the negative charge of the drops increased with the distance through which they fell. In their longer course they naturally picked up a greater number of negative ions.

An interesting result from the meteorological point of view was obtained by making a test after the air had been shut up in the container for several days. The negative charge acquired by the drops was found to be much greater than in ordinary air. Elster and Geitel (*Phys. Zeitschrift*, 2, p. 116, 560, 1901) have shown that enclosed air masses acquire a greater percentage of free ions than free air. This, of course, accounts for the greater negative charge acquired by drops in stagnant air. The presence of moisture was also found to be favorable to the picking-up of negative ions.

These remarkable experiments of Schmauss must be of great value to meteorologists in helping them to form a satisfactory theory of the origin of thunderstorms. Evidently there are at least two great natural processes struggling against each other to create opposite differences of potential between the earth and the atmosphere. For the greater part of the year these processes counteract each other, and prevent a difference of potential from arising which would lead to a disruptive discharge in the form of lightning. But in hot summer weather, when the number of the free ions in the air is increased by the increase of moisture, by stagnant atmospheric conditions, and by the action of the ultra-violet light of the sun, then the Schmauss effect probably gets the upper hand of the Lenard effect, and the negative charge of the earth is so greatly increased that the electric pressure has to equalize itself in thunderstorms.—*The Electrical Review (London) October 17, 1902.*

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*Liquefied Oxygen.*—This substance, which is ordinarily called liquefied air, but which more properly becomes liquefied oxygen by the rapid evaporation of nitrogen, is considered in some cases preferable to the x-rays for the treatment of malignant disease. White would employ it in the treatment of superficial epithelioma, but exclude it in cancer of the breast where no ulceration has taken place. For ulceration, followed by hemorrhages and excessive odor, it is indicated, and it would be an excellent change from arsenic and other caustic measures used as an adjuvant to hasten matters.—*J. A. M. A., Jan.* 24, 1903.

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## Chicago Electro-Medical Society.

The 19th regular meeting of the Chicago Electro-Medical Society was held in room 912 Masonic Temple, February 25, 1903.

Dr. Pettyjohn, the president, being absent, due to sickness, Dr. Replogle took the chair. Dr. T. P. Hall, the secretary being absent owing to sickness, F. K. Camp, acted as secretary pro tem.

Dr. H. P. Pratt said the minutes of the last meeting were not available, owing to illness of Dr. T. P. Hall, who is sick with typhoid fever.

The following paper was then read.

## Views Concerning the X-Ray.

BY BYRON ROBINSON, B. S., M. D.
CHICAGO.

Medicine advances by epochs, a few of which may be cited, which have occurred during the last half century. About 1845 Semmelweiss, of Vienna, and Oliver Wendell Holmes, of Boston, announced that puerperal fever was a communicable disease, which was carried to the patient by the physician or nurse. Dr. Semmelweiss, who received the credit of the discovery, claimed that it was caused by cadaver poison, and introduced the method of washing the hands with chloride of calcium. This was an important epoch for humanity. In 1847 a far reaching epoch occurred when Dr. Long and J. Y. Simpson introduced chloroform to the world. In 1872 Hegar, of Freiburg, Germany, removed the oviducts for uterine myoma to control hemorrhage. In 1872 Battey, of Rome, Georgia, removed the ovaries to anticipate the menopause. In 1872 Mr. Lawson Tait, of Birmingham, England, removed the oviducts for salpingitis; and about 1880 Lister began introducing Listerism; all far-reaching epochs. In 1895 Roentgen discovered the x-rays and became the author of the last important epoch in recent medical history.

With every medical epoch there is a longer or shorter time in which the new discoveries are conducted by pioneers. Pioneers cannot be expected to do perfect work. Pioneers in abdominal surgery were very defective in their operations when compared with the abdominal surgery of today, after twenty-five years of cultivation in the field.

The x-ray epoch is but a few years old and yet it has worked marvelous changes in our views with regard to disease.

Wise men think that the practice of medicine should be placed in the hands of those having proper knowledge of it. It is my opinion that the x-ray should be employed only by those especially trained in its use.

One must be well versed in the x-ray technique necessary for successful results. A proper and scientific knowledge of the workings of the x-ray apparatus is also necessary and again the condition of the tube, which is the all important factor for the accomplishment of improvement, if not a cure, must be well understood. The ability to determine the vacuum of a tube at a glance, knowledge only obtained by long continued use, is evidence of superior skill and is paramount to other technique.

The question as to how long to expose a person for the first time to the x-rays, so as not to produce a dermatitis, is a matter of personal equation. Each person has his or her own personal susceptibility so that in reality we have to feel

our way. However, the successful operator, by his own personal intuition, acquired by long experience, need not have, nor does he have, any fear along this line; the beginner is at a loss to know.

The x-ray seems to have a special election for sperficial carcinoma influencing the growth by its irritant action upon the connective tissue but apparently not influencing the epithelium to any great extent. When the epithelium is unduly influenced to the extent of inflammation we note a rapid metastasis along the adjacent lymph channels; and a cessation of treatment is necessary.

On deep seated malignancy we are in the dark, due to the fact that we cannot watch the process nor the results, and once septic metastasis is established here the results may be fatal, septic pneumonia being the usual cause of death.

Again the x-rays appear to have a destructively selective action on tissue of low vitality, while healthy tissue exposed at the same time does not manifest the same changes.

The present general opinion is that the x-ray treatment demonstrates its efficiency in malignant disease and that renewed treatment may free the patient from disease.

The best method of treatment is a combination of an early radical surgical operation and the x-ray application.

The best results in general is the replacing of the diseased tissue by connective or fibrous tissue or by adipose tissue. Rapid results, but dangerous, can be obtained by sloughing or necrosing the tissue.

What is the x-ray? It is a stimulant. If one touches a frog's heart lying in normal salt solution with a steel needle, a piece of ice, a red hot rod, or passes a stream of electricity thru it, the heart will begin to beat. These various stimulants cause rhythmical movements of the heart. All nature tends toward recovery, and disease cells are in general of less vitality than normal ones. It is well known, for example, that a myoma uteri is a weak lived growth; as pregnancy, or ligation of a small artery will check or even cure the tumor; other growths almost entirely recover by the injection of carbolic acid; while salts of mercury, or K-I, cures syphilis, actinomycosis, etc. The x-ray, like heat, light, drugs, and exercise, is a stimulant. Its penetrating power to reach and act on cells is simply as a stimulant, and since stimulants induce the cells to act normally, the x-ray must be classed among these powers.

X-ray burns are very numerous and place the physician liable to damages. The burns are necessary for cure, because the x-rays necessarily act on the skin first. As in many instances the disease is located considerably beneath the surface, it will be requisite to endanger the skin cells to effectively reach the diseased locality. It is natural to suppose, from what we understand of the action of the x-ray, that the greater number of rays employed the more effect is produced on the diseased tissue. The x-rays act first on the skin as shown by the burns and necrosis of skin tissue, then on the underlying tissue, which is affected more or less intensely according to the degree of dermatitis set up. The reaction on the skin may be noticed in a few days or a few weeks.

W. Schultz, in his experiments on virulent bacterial cultures, claimed to have demonstrated that the action of x-rays was practically nil. While Dr. Pratt, and others, claimed to have obtained totally different results. We know that the x-ray changes the tissues, as swelling and œdema of the epithelial cells arise; the nuclei shrink and the tissues resist cutting instruments.

Another view of the effect of the x-ray may be presented. For example: if I wish to cure endometritis I first destroy the endometrium by a cautery. If I wish

to cure an indolent ulcer I first destroy its granulating surface so that a new granulating surface will appear. Doubtless the x-ray works on a similar principle. It produces its final effect by first destroying certain tissues in order that new normal tissue may arise during the recovery.

We will call an x-ray burn one which produces pathologic symptoms; how numerous these may be is a matter which can only be determined by an experienced operator. We would consider that in ordinary practice there will occur 50 per cent of pathologic burns in every 100 cases of malignancy. An experienced operator alone can judge how often such patients should be treated without being liable to damage for incapacitating the patient for labor, and also the amount of suffering inflicted. X-ray burns recover slowly. In just how far the x-ray operator is liable to pecuniary rewards to the patient is still unsettled by the courts.

There are cases of mammary carcinoma of the atrophic scirrhus type which might probably be better off without x-ray treatment when in the hands of the unskilled, as the patient would not die of the carcinoma if let alone, but the application of the x-ray might produce, by the use of a high tube or exposing too much surface of the body to the x-ray, a dangerously acute lymphangitis from decomposition of epithelia or other cell structure overwhelming the system with sepsis thru the adjacent lymph channels. The proper treatment can be determined only by experienced operators.

In the treatment of cases with x-rays careful observation must be made as to the degree of infection after the first few applications, because extensive metastasis may arise in the adjacent lymph channels which may overwhelm the patient with sepsis and prove fatal. The operator must know by observation how intense and in what quantity, quality, and length of time to apply the x-rays, for each individual case. The x-ray produces a large amount of degenerative waste which must be eliminated and the operator must possess the standard of judgment of what the patient can stand.

Fractures.—In fractures the experienced operator who alone should be an M. D., is able to determine the condition from the skiagraph.

The shadow of the fractured parts requires interpretation, and much depends on the technique. For example, if the fractured parts are placed close to the target there is produced an altogether different shadow than if placed at a distance. The operator must possess experience and knowledge as regards age, relations in reference to cartilage and bone shadows.

Many professional disputes arise in courts as to the uncertainty of x-ray shadows in fractures of childhood. Practically the cartilage of a young child does not make a marked shadow. Hence the inexperienced x-ray operator might be induced to testify that the child had a fracture by noting a clear space between the epiphysis and diaphysis.

Calculi.—Recently acquired knowledge of the x-ray in regard to the shadows of hepatic and renal calculi, is of great importance, and since it came into vogue the ureter shows the presence of more calculi than the kidney. X-ray shadows of renal calculi in the tractus urinarius is quite certain in diagnosis, but experience is required to differentiate such shadows from those found in the tractus intestinalis, especially that of the colon, because in the last segment various mineral salts may accumulate. Heretofore shadows of hepatic calculi have been rather uncertain, due to faulty technique; however, since we have placed the patient with the region of the liver close to the plate the shadows of hepatic calculi have been more accurate.

In 1896 Dr. H. Preston Pratt began to

relate to me his treatment of disease by the x-ray. I met him now and then and his first claim in April, 1896, to me was that the x-ray destroyed pathologic germs, and that he would soon be curing various diseases, as tuberculosis, cancer, etc. For several years I have followed his work and have been pleased with his excellent and substantial results.

I wish here to thank Dr. Robert Gregg for his suggestions in the writing of this paper.

Dr. Gregg's long experience in the use of the x-ray makes him an authority on the subject.

In addition to the paper Dr. Robinson made a few remarks. He said in part, that after watching the x-ray treatment for three years he found that it had done a great deal more than he expected at first, and more than the x-ray men thot it would do. In his opinion the only man who is fit to use an x-ray machine is a man thoroly experienced in its use.

## Discussion.

Dr. Rowell—How much truth is there in the power of x-rays to destroy germs outside of the body?

Dr. Pratt—Our original work along this line was in the first of April, 1896. We then succeeded, with the x-ray, in destroying cultures of eight different diseases. We were at that time successful, but all over the country they failed, and it was a year, or year and a half, afterwards before there were any favorable reports at all outside of our own. In discussing that part of Dr. Robinson's paper in reference to x-ray burns; the reason we have x-ray burns is because the skin has a greater resistance to the electrical current than any other part of the body. One method of partly avoiding the burn is to reduce the electrical resistance by using a cloth saturated with a solution of sodium chloride. With an ordinary direct dynamo by placing the hands on the pole pieces a certain amount of current will pass thru the body without apparent injury to the hands, owing to the high electrical resistance of the skin, but if the skin is moistened it would be a somewhat dangerous experiment. Now all people who perspire freely will not suffer from a burn as quickly as those who do not perspire at all. This is due entirely to the difference in electrical resistance.

I think there is a lot of meat worthy of digestion in Doctor Robinson's paper. He has the advantage of most of us in being a specialist in gynecological lines. He is very familiar with these malignant troubles and has followed up very closely the effect of the x-ray on the tissues. I think, of course, as he does, that we want to be careful and not carry the burn to an extreme degree; we must understand it. I know one thing, as far as sarcoma goes, it is sometimes necessary to burn, and I believe it is justifiable to carry it as far as possible without material injury to the tissues. By rendering the parts aseptic and using a celluloid screen, the extent of the x-ray burn is limited. There is no danger from it as long as it is aseptic; but the trouble is that the patient, either by scratching or otherwise, or for the lack of cleanliness, infects it. If there are any microbes flying in the air between the tube and the patient the celluloid screen prevents them from being driven into the body. Another trouble lies in the fact that in using a high tube the discharge from the terminals of the tube, sometimes known as streamers, have a tendency to produce muscular contraction and this is what causes the infection to be pumped along the lymphatics. This is the only danger as far as the x-ray tube is concerned. Another point, don't expose too much of the surface at a time.

if you do you will have a condition of auto-toxemia. When we watch the patients we will have no trouble. See that all organs of elimination are kept in good working order. If we find out it is impossible to get rid of a septic condition due to breaking down of the mass and nature will not take care of it, it is an excellent thing to remove it and treat afterwards.

I differ with Dr. Robinson in this: I think it is best to ray before operating and also to ray afterwards. To my knowledge, when this method has been carried out, there has not been a single case of recurrence reported.

Dr. Replogle—Would a Turkish bath be a good method of elimination?

Dr. Pratt—Yes, a very good one.

Dr. Robinson—A half normal salt solution is also excellent.

I think there is a lot of damage being done by x-ray workers. A man after treatment gets sick and he does not know what the trouble is. He calls in the doctor and the doctor does not know; tells him he has la grippe. The trouble with this man is that he has sepsis. Now is the time when great damage is being done all over the country by these inexperienced x-ray men. The average doctor does not know enough about the x-ray not to expose too much of the tissues at a time. Result, patient after treatment is sick, and the doctor does not know the cause.

Dr. Pratt—Do you think that is due to the extension of the cancer foci by metastasis or simply the effects of decomposition or auto-toxemia.

Dr. Robinson—Both.

Dr. Pratt—I was speaking of cancer cells in particular.

Dr. Robinson—I cannot answer that.

Dr. Pratt—There are a lot of operators, and first class ones, too, who do not understand that yet. I have, if once, a dozen times lately, in different medical meetings around the country, called the attention of the physicians to that one very thing, and yet the physicians say they don't believe it. After they have given 40,000 treatments, or more, as I have, I think they will change their minds.

Dr. Rowell—Does the x-ray in this instance show an irritation of the skin, necessarily?

Dr. Robinson—There is no irritation of the skin; it is smooth, but the patient becomes sick.

Dr. Rowell—In this metastasis, are the regional glands involved?

Dr. Robinson—Not enough to be felt, but a slight edema may be noticed.

Dr. Rowell—Does the x-ray stimulate fibrous tissue growth?

Dr. Robinson—The epithelial cells are so influenced by the rays that they do not grow; fibrous tissue multiples and crushes them out, yet the epithelial cells are influenced by the presence of the x-ray. What will be done in the next few years? Photo-therapy and the x-ray is a combination that is going to win. The light rays being used a very long time and the x-rays a short time.

Dr. Rowell—I know the x-ray will do some things that we would not look for it to do. I know of a case of eczema, treated by Dr. Hyde, that would not respond to other treatment, yet under the x-ray it disappeared and has not returned for eight months.

Dr. Robinson—In treating deep seated malignancy the inexperienced doctor knows nothing of what he is doing. When the patient begins to feel sick then is when the doctor should stop, but he doesn't. He keeps the patient coming expecting him to continue all summer. Every now and then I see a long article by a doctor who has had an x-ray machine for six months. When I read that he has only had his outfit six months then I stop. A man who has had an x-ray machine only six months cannot be an authority. The x-ray is a very efficient remedy in malig-

nancy and repeated efforts with judicious application may relieve the patent. If the man with the x-ray can make the malignant, non-fibrillated carcinoma, into a scirrhus, he will save the patient. The coming x-ray treatment is going to modify malignancy more than it will cure it.

Dr. Pratt—What we are striving to do, and what I think the x-ray does, is to change the malignant cell to a non-malignant; then, what is necessary after this is to bring about an elimination of the decomposed product.

Dr. Rowell—If it is the case that the x-ray will destroy or prevent the proliferation of epithelial cells would it not be of advantage in treating goitre?

Dr. Pratt—Yes, it would.

Dr. Robinson—Cannot these rays be changed by a modification of tubes?

Dr. Pratt—Partially so. This may be accomplished by making the glass thinner, which would possibly admit of stronger impulse, but the technique will hardly be changed. I do not think we can increase the lines of force above what we have now. There is a certain amount of gas in a tube of a certain size, and the minute particles of gas strike so many square inches of the inner surface of the glass of the tube, and only so many can strike it, and the greater the mass the less the impact, and consequently the less the penetrating power of the ray. It is simply a question of mathematics.

Dr. Replogle—I think the most important point tonight has been the elimination of toxin. I know of one case, which upholds Dr. Robinson's remarks, as to patient becoming sick after x-ray treatment. The patient was a woman who had had no drainage before treatment and a few days afterwards developed what she thought was the grippe.

I would like to ask Dr. Robinson if young persons under 15 with malignancy are very malignant.

Dr. Robinson—Yes, in the young malignancy is far more pronounced than in adults.

Dr. Pratt proposed the following names for membership: N. Le Doit Johnson, M. D., Stewart Johnstone, M. D., A. Ralph Johnston, M. D., Louis E. Zins, M. D., and E. L. Dennison, M. D., who were duly elected.

There being no further business, on motion the society adjourned.

F. K. Camp,
Secretary pro tem.

The next meeting of the society will be held on Monday evening, March 30th, 1903, on the 17th floor (drill hall parlor), Masonic Temple. An excellent program has been prepared.

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**Automatic Regulator for X-Ray Tubes.**

W. S. Andrews, Schenectady, N. Y. App. filed June 5, 1897. An electric heater for vacuum tubes comprising a number of conductors in series, insulated from each other and supported by an electrical insulator adapted to transmit heat to the tube.

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**American Medical Association Meeting, New Orleans, May 5-8, 1903.**

For this occasion the Mobile and Ohio R. R. will make a rate of one first-class fare for the round trip, viz.: $18.00 from St. Louis. Tickets sold May 1–4, inclusive, limit 10 days, with privilege of extension to May 30th on payment of 50 cents. Write Jno. M. Beall, A. G. P. A., St. Louis, for full particulars.

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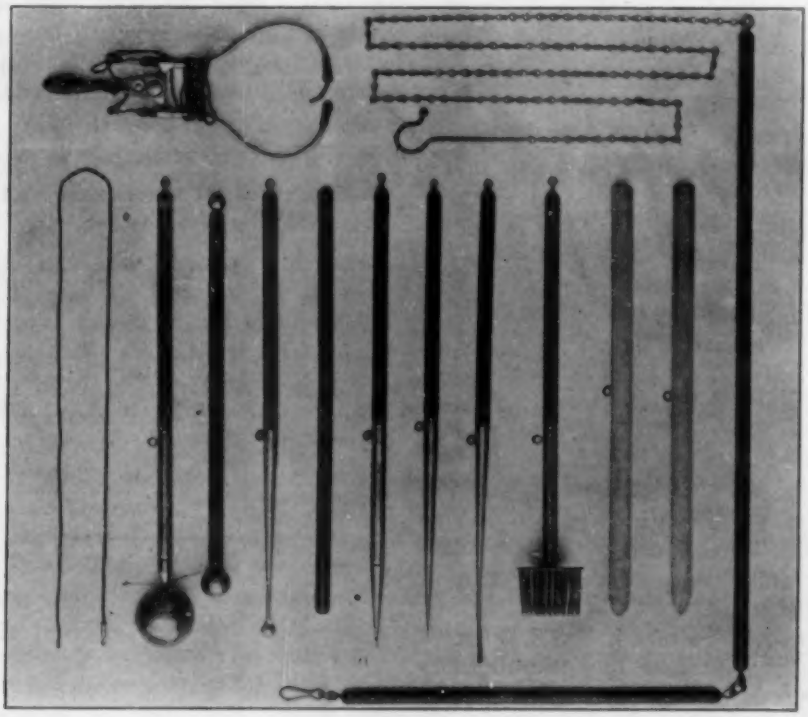
## Editorial.

Professor S. H. Monell, for the first time, made a short visit to Chicago, and called on all of his friends; and among them THE AMERICAN X-RAY JOURNAL was honored. His call was of such interest that the manufacturers of electrical goods and supplies, numbering some 20 firms, gave a banquet in his honor at the Victoria Hotel on the evening of March 14th, 1903. He being the only invited guest of the evening, addressed the meeting on the construction of static machines and electrodes, as well as the technique employed. During the address he said that the static machine manufacturers in the west are ahead of the eastern manufacturers as far as construction of machines go, and that the west has eight static manufacturers to one in the east, but he thot that the western manufacturers were behind in the design of electrodes. The professor took up and discussed the different forms of electrodes calling attention to their weak as well as strong points. He incidentally, but modestly, referred to his own special designs, which we take great pleasure in illustrating below. We regret that the professor did not have more time, as the Chicago Electro-Medical Society intended to have banqueted him. We only hope that the next time he calls the society may have this pleasure.



THE JOURNAL takes great pleasure in presenting to their readers, in the frontispiece, an excellent half-tone of our esteemed friend and co-operator, Prof. A. D. Rockwell, and also take pleasure in calling the attention of our readers to the fact that he is the father of electro-therapeutics of America.

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We are sorry to announce that, owing to the sickness of Dr. Hall, the editor, we have been compelled to delay the commencement of the correspondence course, which should have started in the February issue, until the April or May issue. The first lesson will be a history of electro-therapeutics, which was being compiled by him.

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Prof. John Uri Lloyd's famous satires, the first of which, "The Mother of Sam Hill's Wife's Sister," was published in the September Criterion (1902) are resumed in the January number, with the fourth paper of the series, "Sam Hill, Sheriff of Knowlton, Kaintuck," and purport to be related by "Chinnie Bill Smith," the famous story teller of "Stringtown on the Pike." These satires, written exclusively for the Criterion, will be illustrated by Martin Justice, whose character studies are second to none in the magazine field. Prof. Lloyd's inimitable style and daring, yet kindly humor, will be a rare treat to Criterion readers. A deeper meaning will be read between the lines of these unusual papers by thoughtful minds. The paper, "Why a Kentuckian Stands With His Back to the Stove," "The Testing of Milinda," by Sam Hill, appears in the March Criterion and the remaining stories will appear during the year 1903. The price of "The Criterion" is only $1 a year, monthly.

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**Dermatology and Syphilis.**

January Dr. Martin F. Engman under this caption discusses x-ray therapy, having apparently just waked up to the fact that it is of great value in many cases. He credits Pusey, whose x-ray work began in 1900, with being the pioneer of x-ray therapy in America, oblivious of the fact that the pioneer work not only in America but in the world was done in 1896 by Dr. H. P. Pratt, of Chicago. It has been quite fashionable in certain quarters for writers to credit themselves or their personal friends with doing "pioneer work" in x-ray therapy, and perhaps we ought not to complain when Dr. Engman follows the fashion. Nevertheless a little more attention to truth would not injure the cause of medical science.

It is also stated that "several have demonstrated that radiations of cultures of organisms does not even retard their growth." Any one who has had experience with x-rays knows how very difficult it would be to "demonstrate" such a thing; and in the face of the strong and positive evidence that bacilli in cultures can be killed by x-rays, this is certainly an overstrong statement of a mere opinion.

There is really no excuse for such misstatements. They serve only to discredit the rest of the paper, which is in the main a fair summary of x-ray therapy in dermatology.

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**Science Notes.**

Profs. Haga and Wind, of Holland, in 1899 announced that the x-rays were subject to diffraction. They have recently repeated their experiments and have again proved the existence of diffraction phenomena, and conclude that there is no longer a doubt that the x-rays are, like light waves, perturbations of the equilibrium of the ether. They have sought to evaluate the wave-lengths of the x-radiations, and conclude that these radiations have wave-lengths of the same order of magnitude as light waves.—*Scientific American, Feb.* 21, 1903.

## American Electro-Therapeutic Association.

At the twelfth annual meeting of this Association, held at the Hotel Kaaterskill, Greene county, N. Y., September 2nd, 3rd and 4th, 1902, the following were elected, viz.:

1902-1903.

OFFICERS.

President—Daniel Roberts Brower, M. D., LL. D., Chicago, Ill.

First Vice-President—Maurice Fieschor Pilgrim, M. D., Boston, Mass.

Second Vice-President—Charles Frank Osman, M. D., Boston, Mass.

Secretary—Clarence Edward Skinner, M. D., LL. D., New Haven, Conn.

Treasurer—Richard Joseph Nunn, M. D., Savannah, Ga.

EXECUTIVE COUNCIL.

Robert Newman, M. D., 101 West 80th street, New York, N. Y., chairman (2 years); W. H. White, M. D., Boston, Mass. (1 year); F. B. Bishop, M. D., Washington, D. C. (1 year); Ernest Wende, M. D., Buffalo, N. Y. (2 years); Charles O. Files, M. D., Portland, Me. (3 years); Fred H. Morse, M. D., Melrose, Mass. (3 years).

ORDINARY FELLOWS.

Boardman Reed, M D., Philadelpha, Pa.; T. D. Crothers, M. D., Hartford, Conn.; Harvey H. Roberts, M. D., Lexington, Ky.; John W. Daniel, M. D., Savannah, Ga.; Herman Grad, M. D., New York, N. Y.; Albert C. Geyser, M. D., New York, N. Y.; Theo. H. Newland, M. D., New York, N. Y.; Allen R. Thompson, M. D., Troy, N. Y.; Marcus M. Johnson, M. D., Hartford, Conn.; T. C. Lucke, M. D., Ocilla, Ga.; Hamblin B. Maben, M. D., Kingston, N. Y.; W. L. Kenney, M. D., St. Joe, Mo.; Almerin W. Baer, M. D., Chicago, Ill.; E. Hockheimer, M. D., New York, N. Y.; Josephine Walter, M. D., New York, N. Y.; Willis P. Spring, M. D., Minneapolis, Minn.; William Stevens, M. D., New York, N. Y.; Laura V. Gustin-Mackie, M. D., Attleboro, Mass.; George Z. Goodell, M. D., Salem, Mass.; W. W. Eaton, M. D., Danvers, Mass.; Sigismund Cohn, M. D., New York, N. Y.; Charles A. Covell, M. D., Syracuse, N. Y.; A J. Abeel, M. D., Syracuse, N. Y.; Russell H. Boggs, M. D., Allegheny, Pa.

ASSOCIATE FELLOWS.

W. E. Goldsborough, M. E., Lafayette, Ind.; William H. Hosking, M. D., Masterton, New Zealand.

RESIGNATION.

Elihu B. Silvers, M. D., Rahway, N. J.

COMMITTEES APPOINTED BY THE PRESIDENT FOR THE YEAR 1902-1903.

*On Induction Coils and Alternators.*

Margaret A. Cleaves, M. D., 79 Madison avenue, New York, N. Y., chairman; A. E. Kennelly, F. R. A. S., Philadelphia, Pa.; Burton Kinraide, E. E., Boston, Mass.

*On Cataphoresis.*

F. H. Morse, M. D., Melrose, Mass., chairman; F. B. Bishop, M. D., Washington, D. C.; M. F. Pilgrim, M. D., Boston, Mass.

*On Electric Light Apparatus for Diagnosis and Therapy, and the Roentgen Ray.*

W. Scheppegrell, A. M., M. D., 3723 Prytania street, New Orleans, La., chairman; J. B. Gibson, M. D., Birmingham, Ala.; T. D. Crothers, M. D., Hartford, Conn.

*On Static Machines and Condensers.*

William Benham Snow, M. D., 627 Lexington avenue, New York, N. Y., chairman; F. Schavoir, M. D., Stamford, Conn.; G. Betton Massey, M. D., Philadelphia, Pa.

*On Electrodes.*

Robert Reyburn, M. D., 714 13th street, Washington, D. C., chairman; W. H. White, M. D., Boston, Mass.; C. H. Lador, M. D., Chicago, Ill.

*On Constant Current Generators and Controllers.*

W. J. Herdman, M. D., 48 E. Huron street, Ann Arbor, Mich., chairman; Robert Newman, M. D., New York, N. Y.; Lucy Hall Brown, M. D., Brooklyn, N. Y.

*On Meters.*

R. G. Brown, E. E., 158 Montague street, Brooklyn, N. Y., chairman; Charles T. Scott, M. A. I., E. E., Pittsburg, Pa.; W. J. Jenks, M. A. I., E. E., New York, N. Y.

*On St. Louis Exposition in* 1904.

William Benham Snow, M. D., 627 Lexington avenue, New York, N. Y., chairman; William J. Morton, M. D., New York, N. Y.; W. E. Goldsborough, M. E., Lafayette, Ind.

The next (thirteenth) annual meeting will be held at the Hotel Windsor, Atlantic City, N. J., on Tuesday, Wednesday and Thursday, September 22nd, 23rd, and 24th, 1903.

CLARENCE EDWARD SKINNER,
Secretary.

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**Therapeutic Range of X-Rays.**

Dr. J. E. Gilman (*Clinique,* Feb., 1903), shows a wide therapeutic range of the x-ray. Loring had found it curative not only of cancer and lupus but also of goitre, tuberculous glands and joints, prostatic hypertrophy, nephritis, rheumatism, phthisis, pruritis, eczema, and superficial malignant growths. Dr. Gilman adds to this list, asthma, impacted gall stone, inflammation of the gall duct, peritoneal and intestinal adhesions due to acute or chronic inflammation, Graves' disease, fibroid tumors, adenomas and indurations. Murphy regards it as superior to injections of formalin, iodoform and glycerin in tubercular disease of joints. Dr. Gilman cites three cases of tuberculosis of the spine from Dr. Murphy's report, where the x-ray produced gratifying results. In these cases he found that peraphlegia is caused by a granuloma within the spinal canal caused by rupture of the tubercle thru the compact bone, which compresses the cord. By doing a laminectomy, curetting the body of the vertebra, and opening the spinal canal the pressure is relieved. He cites three cases where the x-ray was used to cure the tubercular factor in the disease. The diagnosis was confirmed by microscopic examination of pus obtained by making a lateral puncture with a large hypodermic needle between the ribs, thru the pleural cavity and into the tubercular area in the body of the vertebra; the location being determined by the pain. In intestinal fistula he found that the x-ray increased the amount of conective tissue and closed the sinus. Edwards had used the x-ray in tabes. Under its use the knee-jerk returned and the ataxy diminished. He used the high tube over the lower dorsal and the lumbar vertebra. Dr. Gilman cites the opinion of Rainear as corroporative of his own experience that there is conclusive proof that the x-ray destroys or causes degeneration of malignant matter whether superficial or deep. He cites many authorities to prove that deep seated cancer and tuberculosis is amenable to an encouraging degree to treatment with the x-ray. He began his observations in 1896-7, the early cases being treated in the laboratory of Dr. H. P. Pratt.

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**Value of Electrolysis in Eustachian Tube.**

N. H. Pierce offers the following conclusions: (1) In otosclerotic disease, electrolysis is useless; (2) In the great majority of cases of catarrhal disease, it has no advantages over other methods of treatment; (3) In a certain few cases where there is probably a soft exudate near the isthmus, it may be regarded as of some value.—*Archives of Otology.*

Twelve cases of malignant disease treated by the Roentgen Rays.

H. P. Moseley, M. D., (*American Medicine*, January 11, 1903), makes this report. He used a ten-plate static machine, and a 50-cm. coil; also a direct current of 110 volts, supplied by the hospital, directly into the interrupter, no rheostat or transformer being required. Areas treated at a distance of 15 to 30 cm. measured from the target of the tube; tissues protected by lead foil; time of exposure 5 to 10 minutes on alternate days; occasionally oftener. When using the coil 1½ to 2 amperes was passed in the primary. The tube giving out a large number of rays, not highly penetrating was found the best. Tubes of high vacuum cause x-ray burns but do not have a greater curative effect compared with low ones. Case. (1) Epithelioma of lip. Ulcer ½ in. by ¼ in. slightly indurated around edges; slight scabs on surface, bleeds easily. Treatment. Low vacuum tube, distance 30 cm., later 15 cm., time 5 to 10 minutes; total 19, treatment about 3 a week, from March 7 to May 24, ulcer healed; remained healed Oct. 7. Growth superficial, no glands involved, no burns. (2) Epithelioma of lip. Patient aged 80. Cancer similar to No. 1. Treatment. Very low tube, excited by coil; distance 8 to 15 cm. from area treated; 17 exposures of 10 minutes each at irregular intervals; no effect from treatment; afterwards 13 exposures given more frequently; result, area twice as large as at first; treatment discontinued; improvement; after about two months cancer had healed; in all 36 treatments. (3) Epithelioma of face. Was cauterized and treated with ointments but continued to ulcerate with the formation of lumps; ulcer 1 inch in diameter on a line with ala of nose and involving lower eyelid; discharges pus and blood and pains constantly. Marked ectropion of lower lid. Treatment. Low vacuum tube; exposure every other day for five minutes, distance 20 cm. skin very sensitive, becoming quite red; treatments twice a week. Began May 1, on Sept. 20 ulcer ¼ inch in diameter, no pain, new skin healthy. Had not entirely healed January 1, 1903. (4) Carcinoma of jaw. Began as ulcer at the inner side of left cheek from sharp tooth which persisted. Examination. At angle of left lower jaw swelling size of hen's egg; red, adherent to skin and underlying bone with thin, yellow discharge from summit; just above angle of mouth a reddened nodule exudes a thick, yellow discharge. Treatment: Tied left external carotid artery; wound healed by primary union. X-ray exposure 5 to 10 minutes, low tube, distance 20 cm. Eight treatments on alternating days without improvement. Patient died sometime after. (5) Carcinoma of breast. Inoperable. Examination. A large nodular, heavy, bluish mass in lower part of breast including axilla; no edema of arm; general condition fair. Treatment: High and medium tubes, exposure 5 to 10 minutes, distance 25 cm. Seven treatments; died after several months. (6) Recurrent carcinoma of breast. Had breast amputated and pectoral muscles removed and axilla cleaned out a year before. Had constant pain in wound shooting down arm. Recurrence after four months; excision; x-ray treatment after six weeks; low tube, exposure ten minutes, distance 20 cm. on alternating days; improved for a time; recurrence and metastasis later. Left hospital and is supposed to have died. (7) Recurrent carcinoma of breast. Amputation. Examination. Many hard, reddened, infiltrated spots ½ to 1 inch in diameter scattered over the site of the scar. Treatment. Medium and high tubes; distance 25 cm.; exposure 5 to 10 minutes on alternating days. Improvement. Treatment neglected

and finally her condition became so poor that they were discontinued. (8) Carcinoma of inguinal glands. No improvement from treatment. (9) Carcinoma of inguinal glands. Started in prepuce and extended to inguinal region; excised several times. Examination. Mass like irregular collection of small glands, firm and slightly tender. Treatment. Medium high tube, excited by coil, distance 20 cm., time 5 to 10 minutes, area treated 6 by 4 inches, at first on alternate days, when skin became red, at longer itervals, laterally every day. Improvement early, mass grew smaller, general condition improved, gained weight. Result most satisfactory. After nine months no recurrence. (10) Sarcoma of pharynx. Condition hopeless. Treatment afforded no relief. Died of exhaustion. (11) Sarcoma of buttock. Excised several times. Examination. A tumor size of child's head in site of former operation, passing thru the great sciatic notch. Coley's erysipelas toxin was tried but without apparent effect on the growth of the tumor. Treatment by x-rays. From January 30 to February 21 she was given daily treatments with two omissions. Distance of target 8 cm. to 12 cm. from surface of tumor, first two exposures 10 minutes, the rest 15 minutes; high tube. Tho there was marked improvement, she died of exhaustion. (12) Sarcoma of temporal region. Had a sarcoma removed from left temporal region. nineteen years before. Examination. Left zygomatic region occupied by diffuse, firm swelling; 7.50 cm. above and 5 cm. below the line of zygoma. Surface smooth not hot, red or tender, raised 2 cm. above surface of skin. Treatment, static machine, low tube, distance 15 cm., exposure 5 minutes. Improved. Treatment every day, time 10 minutes, coil used with 2 am. of current passing in primary. After seven treatments swelling entirely disappeared.

*Roentgen Rays in Cancer.*—From clinical experience up to the present time, Leonard considers the following conclusions justified: 1. We have a more potent remedial agent than any other in the Roentgen rays, but they can not be considered as a cure-all, and should not be employed to supersede operation, but to supplement it. The best interests of the patient will be served by early diagnosis, early radical removal by surgical intervention, and subsequent thoro treatment of the infected area by the Roentgen method. Inoperable cases and superficial growths not liable to produce death or give rise to metatases, and also recurrences, may reasonably be submitted to Roentgen treatment previous to operation. It should only be employed by practitioners qualified by education and experience to judge of the therapeutic effects and estimate the proper dosage. We need wider clinical experience before we can have an effective application of this remedy in deep-seated malignant disease.—*Journal A. M. Association, Dec.* 13, 1902.

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In American Medicine, January 11, 1903, is an article by Dr. H. P. Moseley in which the following appears. He uses a 10-plate static and a 50-cm. coil, also a direct current of 110 volts. He evidently means that a 50-cm. spark coil in inches would be equivalent to a 20-inch spark coil. He says tubes of high vacuum give x-ray burns but don't have a greater curative effect compared with low tubes. As a matter of fact the low tubes burn long before the high one. The reason there is a greater number of lines of force thrown off from the tube. High tubes should never be used for malignant troubles. Unlike a good many operators the doctor has discovered what is true that the low tube is the one that does the good work in malignant troubles.—ED.

*Roentgen Rays in Practice.*—Lowe, in a paper read before the Roentgen Society in London, gives an account of his experiences of the use of x-rays in the treatment of cancerous growths, lupus, rodent and other ulcers. In cases of new growths he found exposure to x-rays to be of very great benefit, and many diseases formerly supposed to be incurable now yield to this treatment. In one case of a malignant growth on the breast, he had given an exposure of 25 minutes; here an operation had been advised, but this was rendered unnecessary by the therapeutic action of the rays. Turning to radiography, he described cases in which this had been of the greatest service in his practive. It is of the highest importance in radiography to have the anode adjusted immediately above the line of fracture in order to secure good results. The reason for the slow advance seemed to lie in the want of definite lines of treatment and of suitable apparatus, which should be readily available.—*Lond. Elec. Eng., January* 9.

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*Theory of the Wehnelt Interrupter.*—KLUMPATHY, in a paper presented to the Hungarian Academy of Sciences, says that the interruptions in the Wehnelt interrupter are caused by the development of steam in the acid which then acts as an insulator. Simon had explained the steam production as being due to Joulean heat. The present author shows that his explanation is not sufficent and that the Peltier effect plays an important part. A platinum electrode in sulphuric acid is heated as anode and cooled as cathode by the Peltier effect. As a rule the thin wire is made the anode of a Wehnelt interrupter, so that Joulean heat and Peltier effect here act together, producing a high temperature and causing a strong generation of steam. If the wire is made the cathode, it will be cooled by the Peltier effect, though it will receice its share of the Joulean heat. There will furthermore be a liberation of hydrogen at the cathode, and a voltaic arc will play between the cool wire and the warm, well conducting acid, provided the current intensity be high; as a result the wire cathode will be liable to fuse. If the currents are not very strong, the wire cathode will not make a very good Wehnelt interrupter. Klupathy further observed that the frequency of the interruptions of a wire anode which was not pointed, was increased when the electrode was especially heated by a branch current. As regards condensers and self-induction, he finds that when the condenser is joined in parallel to the interrupter, the frequency will rise if the anode wire is thin and the self-induction small, but will diminish if the wire is thick and the self-induction considerable. In his opinion, the process could then be explained in the following way: The heat produced in the wire electrode, both Joulean and Peltier, evaporates the acid in its immediate neighborhood; the steam generated insulates the electrode, and interrupts the current momentarily; the extra current then strikes thru the steam, the spark re-establishes the circuit, and the phenomenon repeats itself.—*Electrical World and Engineer, Jan.* 10, 1903.

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*Cancer.*—The parasitic theory of cancer is discussed by Robin, who is not willing to go quite as far as the Harvard Commission in their conclusions. He is willing to admit that protozoön-like types are found in cancer, but this does not establish their interrelation. It is readily conceived how parasites may contaminate tumors which are exposed to the external air, and exist as a secondary invasion and perhaps accelerate the growth and cachexia.—*J A. M. A. Dec.* 13, 1902.

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Electricity in Gynecology.—Dr. G. Betton Massey (*Jour. Adv. Therapeutics*, Feb., 1903), counts electricity as our best remedy in developmental imperfection of function, and post-infective disorders in women. In young women menoralgia is due to imperfect development. Electricity promotes a healthy circulation in the pelvic sympathetic ganglia and affords relief in dysmenorrhœa. In older women this weakness leads to post infective changes, endometritis, metritis, sulpingitis, ovaritis, or perimetric deposits because there is not power to throw off the debris of the microbic-phagocytic contest constituting the original affection. Here electricity cures by stimulating errant metabolism or sterilizes by cataphoresis. Trophic disorders in mature women giving rise to displacements, even fibroid tumors, arise from infections or a faulty circulation. Nervous phenomena—neuralgias, hysteria, neurasthenia, etc., as well as sexual impotence, neural and muscular, are amenable to electricity. He uses a dispensing pad, half an inch thick, made of absorbent cotton covered with cheese cloth, with a flat spiral of brass wire on the under side for the current, 12x8 inches for over 80 ma., allowing half an inch of water between the skin and metallic conductor. For most vagino-abdominal applications he uses a large olive-bulbed electrode covered with absorbent cotton, the shaft insulated with black sealing wax, and re-fused and sterilized in an alcohol flame before each application. For cataphoric application the bulb is amalgamated with mercury before each application; the instrument being connected with the positive pole. From 50 to 80 ma. are employed for five or six minutes tri-weekly, the mercuric oxychlorides being driven into the affected region. The treatment causes some vaginal irritation, which is probably remedial. Menstruation may be arrested for a time. Following the mercuric cataphoresis a flexible intro-uterin instrument of platinum is used to cure residual endometritis. It is sterilized in the flame, covered thinly with cotton and moistened with water and synol soap solution. After using, the cotton is brushed off in water to avoid breaking the fragile tip. Intra-uterine mercuric applications are made with a Simpson sound, the tip amalgamated, and the shank insulated with soap. A current of 80 to 150 ma. is used and in treating uterine fibroids, with mercury on the electrode when application is positive. In tubercular glands of the neck a small electrode of thin zinc is amalgamated and inserted under the skin with cocaine anesthesia. A current of ½ to 3 ma. is turned on for fifteen minutes. A new sliver of zinc is employed for each treatment. A second application is made after a few days, lasting fifteen to thirty minutes, with current of such strength as the patient can bear. Sometimes chloroform anesthesia is necessary in unruly patients when 50 ma. may be used. In cancer of the breast treated by mercuric cataphoresis, 24 electrodes are prepared, each electrode attached to a No. 28 piece of insulated copper wire, and the whole divided by plaiting the wires into six groups.

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*The Use of Electricity in Sprains.*—Drs. Charrier and Planet have called the attention of the French medical public to the advantages of using electricity in sprains. Apostoli recommended employing the Faradic current with very rapid interruptions. The electrodes should be of carbon covered with chamois skin, and while the positive electrode remains in one position, the negative is moved all over the painful area. The results would seem to be surprising. After five minutes the patient is able to get up and walk. the pain having ceased for the time being. Two applications should be made daily, and the patient told to walk as soon as possible.—*Med. Times, July* 1902.

*Cases Treated by Roentgen Rays.*—Childs, of Denver, reports a series of fourteen cases treated by Roentgen rays. Six were of epithelioma; all were cured or still under treatment with such improvement as to warrant the expectation of complete cure. Three were of lupus erythematosis; all were cured. One was of tuberculous glands of the neck; improved, but still under treatment. One was for secondary carcinoma of the spine and recurring nodules after complete excision of the breast; much relief from pain by the treatment, but the disease resulted fatally. One was of tuberculosis of the apex of each lung; the patient is improved and is still under treatment. One case of chronic eczema completely recovered. One case of Hodgkin's disease appears to be improved, and is still under treatment.—*American Medicine, Jan* 31, 1903.

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*The Roentgen Ray in Gynecology.*—Eden V. Delphey enumerates the various conditions under which the Roentgen ray may be used in and above the pelvis; but the main use of the Roentgen ray in gynecology is in the treatment of malignant neoplasms. Whenever the diagnosis is made sufficiently early, the tumor and often all the pelvic reproductive organs should be removed by surgical means so as to get entirely beyond the malignant growth and prevent recurrence. When this can be done the protuberant portion, if of the cervix, should be removed, and the rest subjected to the influence of the Roentgen ray. Quite a number of cases of carcinomas have been very much improved and epitheliomas have apparently been entirely cured by this means. As certain death is otherwise the only outlook, the patient should be given the benefit of the chance.—*American Medicine, Feb.* 28, 1903.

Value of the X-Ray in Cancer—A. R. Robinson, M. D. (*Am. Jour. Surg. and Gynecology,* March, 1903), advises caustics and x-ray in the treatment of cancer. The greater majority of superficial cancers can be cured with caustics with slight deformity. We must first recognize the form of the cancer, its rapidity of growth, the direction of extension, and the degree of cancerous infiltration. Of the technique of x-ray treatment, we must observe the changes in tissue, normal and pathological, which are produced by it, the character of the exposures, the interval of time between each, the distance, etc. In superficial cancer use a low tube, and for deep-seated malignant growth use a high or medium tube. If applied before the deep-seated tissues are invaded, a large majority of superficial epitheliomata can be cured with x-rays. If the disease is single, and not larger than a silver quarter dollar, treat with caustics, as pyrogallic acid, arsenic, acid nitrate of mercury; if multiple and deep-seated use the x-ray. It influences the nutrition of the skin so as to prevent recurrence after curing the cancer. Here combine x-rays with caustics and internal medicines, as alkalis, arsenic, thyroid extract; and avoid a meat diet. If the cancer is a papule or a tubercle, surface unbroken, x-rays will cure; but caustics here are to be preferred, as caustic potash, the Paquelin cautery, or arseneous acid paste. Excision under local anesthesia with ethyl chloride or cocaine injection. In lesion of the eyelid with invasion of epithelial tissues, x-ray treatment is best; protect the eyeball. Papule or tubercle on the nose covered with normal skin treat with caustic potash or acid nitrate of mercury. The rays do best when the skin is broken. For epithelioma of the alae use x-rays; if a wart or eczematous patch use caustic and follow by x-rays. In cancer of bone x-rays is best. In rodent ulcer extending

into the deep tissues about the eye, etc., the x-ray is our only resource, even hopeless cases are cured. In mammary cancer cures have been reported after amputation. For superficial cancer of the lip use caustic potash; if deep the Paquelin cautery. In cancer of the throat use Paquelin cautery. The prognosis is unfavorable here, as also in cancer of the tongue. In internal cancer as of the stomach or uterus the pain may be lessened and the disease retarded but, so far, not cured. The rays should be used before and after amputation in cancer of the breast and in all inoperable cancers.

*Electrolysis in Eustachian Salpingitis.*—The following are the general conclusions of Matlack's article:

The 75 cases described represent applications of electrolysis extending into the thousands, which should be sufficient to allow a fairly accurate estimate of its value.

Excluding purely labyrinthine conditions, it has been of service in almost all other forms of deafness, and especially in cases of moderate degree, in which the most pronounced changes were in the tube.

The best results can not be obtained from its unaided use, so this should be supplemented by any other measures that have formerly been found of service. It is especially important to have free access to the tube, and to this end septum irregularities should always be corrected and hypertrophies of the turbinals cauterized. I use a routine way in all cases—solutions of iodin, menthol and camphor, conveyed to the parts by nebulizers—to improve the circulation in the nasopharyngeal mucous membrane. After electrolysis has restored the normal caliber of the tube, a further use of vapors to the middle ear after the method of Dench will be found of great value.

Patients who have been persuaded to continue in this line of treatment for a sufficient length of time are unanimous in their approval, and I am convinced that it marks a distinct advance in aural therapy.—*Jour. A. M. A., Feb.* 21, 1903.

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*Aortic Aneurysm Treated by Electrolysis.*—H. A. Hare reports a case, and the conclusions which he reaches are as follows: Electrolysis, in properly selected cases of aneurysm, is a valuable measure, and prolongs life. The operation itself is neither dangerous nor painful. The failure of permanent cure does not depend so much upon the failure of the operation to limit the disease locally as on the fact that the adjacent parts of the blood vessel are weak and, when the most bulging area is solidified by the clot, these lateral areas may later on give way. Even in these cases life is prolonged by the closing of the weakest area, and it is not to be forgotten that in at least one case (Stewart's) life was prolonged three years, death taking place from an alcoholic debauch.—*Proceedings of the Philadelphia County Medical Society.—Medical Record, Feb.* 21, 1903.

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*Roentgen Ray in Obstetrics.*—Cooke finds that the value of the x-ray for studying the dimensions of the pelvis is practically lost on account of the difficulties of its use, and at best it is probably not so reliable as mensuration and palpation performed by a skilled observer. In the study of the gravid uterus the results are wholly unsatisfactory when compared with those obtained by the ordinary recognized methods of examination. For diagnosing certain forms of ectopic gestation fairly reliable presumptive evidence may possibly be secured, but more positive methods will be needed before it can be accepted. Advanced pseudocyesis could doubtless be detected by the use of the rays, but a little chloroform will accomplish the same results more easily. In suspected twin pregnancies, where diagnosis can not be made the x-ray would be of service.

## Correspondence.

EDITOR X-RAY JOURNAL:

In the case of a fibrous liver, enlarged and elongated so that the right lobe reaches several inches below free border of ribs, what would stand in the way of the x-ray bringing about repair, as in cases of malignant origin? Or have we on record the successful treatment of these cases?

Your reply to this inquiry will be appreciated. Sincerely yours, L. A. F.

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[Use the ray by all means if the case is malignant, if not malignant to reduce the size of the liver use a direct current over the region of the liver. Interrupt this direct current frequently. Use a current as strong as the patient can stand from 25 to 75 ma.—ED.]

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DEAR DOCTOR:

We desire your advice in regard to the treatment of the following cases:

The first was diagnosed as an epithelioma on microscopic examination, and located on the vulva. We excised the diseased tissue, and the wound healed to a spot the size of a dime, when disease appeared at other points about the vulva. We then employed the x-ray, giving twenty-minute treatments every second day. This caused x-ray burns of the mucous membrane, which rendered further treatment intolerable. While the burns were healing we used a spray from the wooden ball electrode, and also positive spray and Morton wave. No benefit resulted from the treatment, and, the disease progressing, we again resorted to excision and repeated the x-ray and static treatments, but without success. She is now so weak that treatments cannot be continued, and is in a most wretched plight, awaiting the inevitable end.

The second patient is a lady, aged 40, who has a tumor on the left side of her neck about four by five inches in size, which, on microscopic examination, proved to be a large-celled sarcoma. It is nodulated, varicose, of a bluish color, and at times bleeds profusely. It is slightly movable, extends deep into the tissues, and is raised about half an inch above the surface. She had x-ray treatments for three months, till stopped by burns, now two weeks since. The growth has shrunk a little, but the result is unsatisfactory. Shall we excise and treat with the x-ray? Shall we try Massey's mercuric cataphoresis? Is it safe to use 120 volts so near the nerve center and the pneumogastric nerve? Are there special conditions under which x-ray treatment of cancer is unavailing? J. F. M.

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[In regard to the first patient there are several things to be taken into consideration. There may have been a general infection before the excision; or the static breeze may have been used so close to the parts as to cause muscular contraction which would tend to pump the infection into the system through the lymphatics; or too much surface may have been exposed to the x-ray at a time, breaking down an excess of malignant tissue with a resulting auto-infection.

In treating malignant cases with x-rays it is necessary that all the eliminating organs be kept active in order to carry off the effete matter which is produced thru electrolytic changes.

In regard to the second case, if there is a septic mass it is wise to excise, after a reasonable number of x-ray treatments have been given to prevent auto-infection; which will certainly take place if the septic mass is not removed.

We cannot say that there are conditions that contraindicate the treatment of cancer with x-rays, tho some patients do better than others under apparently like conditions.

Dr. Massey's treatment by mercuric cataphoresis will appear in our April number. In this paper he points out the danger of treating deep seated tumors of the neck in this way. With due care it might be practicable in this case but you would be the best judge of that as she is under your care.—ED.]